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WAR FOOD ADMINISTRATION
Office of Marketing Services

RECENT OBSERVATIONS ON POULTRY DISEASES FROM A FOOD INSPECTION STANDPOINT

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During the 17 years since the Federal poultry inspection service was established, over one billion pounds of dressed poultry have been inspected. Of this amount, over 18,000,000 pounds, or 1.69 percent, were condemned as unfit for food -- an amount representing an estimated cash value of \$5,000,000.

The following table 1 shows the number of pounds of poultry inspected:

Table 1.--Poultry, dressed: Quantity officially inspected and quantity rejected, United States, 1928-44

| Year | Inspected | Rejected | Rejected |
|------|-------------|-----------|----------|
| | Pounds | Pounds | Percent |
| 1928 | 3,150,423 | 369,649 | 11.72 |
| 1929 | 20,702,016 | 812,055 | 3.92 |
| 1930 | 22,571,406 | 997,954 | 4.42 |
| 1931 | 15,986,239 | 773,013 | 4.83 |
| 1932 | 14,515,707 | 492,772 | 3.39 |
| 1933 | 15,316,739 | 468,173 | 3.06 |
| 1934 | 18,461,442 | 538,147 | 2.91 |
| 1935 | 23,266,090 | 515,808 | 2.22 |
| 1936 | 32,950,582 | 697,488 | 2.11 |
| 1937 | 43,578,769 | 738,913 | 1.69 |
| 1938 | 43,538,661 | 793,965 | 1.82 |
| 1939 | 62,607,663 | 968,543 | 1.54 |
| 1940 | 77,590,774 | 1,273,317 | 1.64 |
| 1941 | 94,499,280 | 1,573,339 | 1.66 |
| 1942 | 147,300,893 | 1,913,699 | 1.30 |
| 1943 | 180,910,916 | 1,736,279 | 0.96 |
| 1944 | 178,776,082 | 2,232,742 | 1.25 |

The variance in the yearly percentage of condemned poultry is due to the practice during the early years of inspection, of using a large percentage of culls for canned poultry products. The percentage rejected from such birds is so high that it is not profitable to have them inspected. There has been a steady decrease in the inspection of lower-quality poultry.

The percentage of rejections depends largely on the quality, age, and origin of the poultry. The average of condemnations of Grade A broilers is less than 1/10 of 1 percent. However, in a lot of Grade C broilers inspected on the Del-Mar-Va Peninsula in the spring of 1944, 140,000 out of 250,000

pounds, or 56 percent, were condemned. Midwestern A and B grade fowl usually suffer 1 1/2 to 2 percent condemnation, due largely to the high incidence of avian tuberculosis. The percentage of condemnation of old cocks is not as a rule so high, it being about 1 percent for Midwestern A and B grades.

Grade A turkeys usually have a very low percentage of condemnation. However, the percentage of condemnation in some individual lots and in low-grade turkeys is sometimes high. In the case of flocks affected with an acute systemic disease the condemnation may run as high as 90 percent. Losses from condemnation in ducks and geese usually are very low.

Table 11 shows the percentage of poultry condemnation during 1944 in all areas in the United States for each cause listed. This is based on the number of birds and not on weight as are the figures in table 1. Expressed in weight, inspections that year included 170,240,090 pounds, and rejections 2,111,652 pounds, or 1.24 percent of the poultry inspected.

Table 11.--Poultry, condemned: Percentage of condemnations
for each cause listed (2,111,652 pounds)

| <u>Cause</u> | <u>Percent</u> |
|-------------------------|----------------|
| Tuberculosis - - - - - | 40 |
| Emaciation - - - - - | 4 |
| Septicaemia - - - - - | 15 |
| Leucosis - - - - - | .8 |
| Peritonitis - - - - - | 4 |
| Tumors - - - - - | 4 |
| Abscesses - - - - - | 3 |
| Bruises - - - - - | 3 |
| Parasites - - - - - | 1 |
| Decomposition - - - - - | 11 |
| Cadaver - - - - - | 1 |
| Other Causes - - - - - | 6 |

The laboratory of the poultry inspection service was established in June 1944. The Pathological Division, Bureau of Animal Industry, U. S. Department of Agriculture, has furnished office space, equipment, and a helping hand.

It might be well to point out here that the research or diagnostic laboratory approaches the study of poultry disease from a different standpoint than does the laboratory of the Office of Marketing Services. The former studies disease with the purpose of controlling it; the latter is primarily concerned with the wholesomeness of the slaughtered bird. The determination of the disposition to be made of carcasses of birds slaughtered for food is the chief function of the Office of Marketing Services laboratory. The specific duties of the laboratory are to establish and maintain uniform interpretations by the inspectors of the instructions governing disposal of diseased carcasses and parts; to determine wholesomeness of processed poultry products, to study unusual conditions where poultry inspection is carried on, and to determine the disposition of such cases. For example, frozen chicken livers which contained numerous white

pinhead granules were sent to the laboratory last winter. These livers had previously been inspected by our service and the presence of the granules was not observed before the livers were frozen.

Histological examination revealed the presence of numerous needlelike crystals arranged in radiating bundles. A slide of these will be shown. Study of the literature on the subject revealed a report by Ostertag ^{1/} as follows: "In smoked pork, most frequently in Westphalian hams, white spots occur, which macroscopically may be confused with calcified trichinae, but which under the microscope, are easily recognized as granular deposits. In these deposits, the occurrence of which was first made known by Virchow, we have a case of an artificial product due to the method of preservation. They are found in the form of irregular heaps of crystals varying in size from one to several millimeters -- according to Voit these deposits consist of tyrosin."

Edelmann, Mohler, and Eichhorn have this to say with respect to tyrosin deposits: "Tyrosin deposits may form on barreled livers, which are preserved in brine (Groning). The surface of such livers, and the intima of the vessels of the liver, are covered with small roundish, millet-sized granules, which show a yellowish center, surrounded by a narrow, whitish-gray zone. On section such a liver appears mottled and sprinkled with white dots. Microscopically, under large magnification and after clearing with glycerin, fine light needles lying closely together in bundles may be seen radiating from the opaque yellowish granules toward the periphery."^{2/}

The histological technique employed in the preparation of these sections of livers apparently removed the crystalline material. However, the outlines of these crystals can be plainly seen and it is believed that the crystals were probably tyrosin deposits.

Problems which to most of you may seem of secondary importance, are frequently of great importance in the work of the poultry inspection laboratory. Recently the Food and Drug Administration submitted some broilers from the Shenandoah Valley of Virginia which showed typical "scratched backs." The question raised was, "Are these birds fit for food?"

Since 1928 the inspectors have become familiar with this condition. A report was made to the Administration that the lesions were commonly found in broilers and an explanation was given of our disposal of such cases. Due to the fact that some 275,000 pounds of poultry were involved, and that the Army Veterinary Corps had also sent in similar specimens, an investigation at the plants and in the brooder houses was made. It revealed the following facts:

Scratched backs occur rather frequently in broilers throughout the year but particularly during the spring when sex instincts develop early in the male.

- 1/ Ostertag, R.V., and Wilcox, E.V., 1916. Textbook of Meat Inspection. 545 Bailliere, Tindall and Cox, London, England.
- 2/ Edelmann, R., Mohler, John R., and Eichhorn, A., 1943. Meat Hygiene. 365 Lea and Febiger, Philadelphia, Pennsylvania.

The type of floor and litter have a bearing on the severity of back injuries. For instance, with concrete floors and shallow litter the birds wear off their toenails; with wooden floors or deep litter they retain their sharp nails. Flocks composed of crosses appear to be more flighty and tend to pile up more than purebred Rocks or Reds.

The chief cause of the appearance of the injuries on the broilers was the frequent practice of processors to slaughter birds as they were received from the farms instead of following the usual practice of confining them for from 3 to 5 days in batteries for further feeding and thus allowing the lesions on the backs to heal. With such treatment evidence of the wounds usually disappears by the time the birds are slaughtered.

Another reason for such a number of affected birds being found at that time was that some poultry processors were trying to get the Army to turn down the birds so they could be sold in civilian markets. To accomplish this the processors were having their graders hunt for and point out to the Army inspectors any skin blemish that could be seen.

Such lesions were produced experimentally in the laboratory by scratching the skin with the toenails of the birds. The lesions appeared scabby in from 12 to 16 hours after trauma, and persisted from 72 to 118 hours depending on the severity of the injury.

Some experiences encountered in the poultry inspection work with tuberculosis in birds are reported here in order to call attention to this problem and to ask for your criticism and comments.

Tuberculosis in muscovy ducks originating in the area around York, Pa. has been observed quite a number of times in females but never in males. Tuberculosis in other domesticated ducks has been reported by some inspectors, but so far as we have been able to determine no laboratory confirmation of these cases has been made.

My own experience with turkey inspection is limited to those raised in the eastern United States and in turkeys from that area I have never diagnosed tuberculosis. However, last fall a consignment of dressed Argentine turkeys, slaughtered in South America were eviscerated in Omaha. Some of these birds had lesions which were different from any I had ever seen. They occurred in the lungs, the liver, the spleen, on the mesentary, and in the bone marrow, and were perfectly spherical. In individual birds they were the same size except for the bone marrow lesions, which were smaller. In different birds the size of the lesions varied from 4 to 15 mm. in diameter.

One of the supervisors in the poultry inspection service said that he had seen such lesions before and that the laboratory diagnosis was tuberculosis. Histological examination of the Argentine turkey lesions showed a necrotic center surrounded by giant cells, epithelioid cells, and a dense connective tissue capsule. Numerous acid-fast organisms were present in the necrotic center. We were unable to find any daughter or secondary tubercles in the material examined.

Tuberculosis in chickens is so regularly characterized by the development of secondary tubercles around the primary lesion that on macroscopic examination we look for these secondary tubercles and the resulting irregularly shaped lesion, in order to aid in the diagnosis of tuberculosis.

We concluded that the turkeys under consideration were able to prevent the escape of the tuberculosis organisms from the primary lesion and for that reason the turkey lesions differed from those usually found in chickens. There is a question as to whether or not all turkeys have this resistance to the spread of the tuberculosis organisms from the primary lesion. A study of the literature failed to reveal any description of tuberculosis in turkeys although it is reported by many workers. As a result of these observations inspectors in the field were asked to send in turkey specimens which they thought were tuberculous.

So far, 24 specimens suspected of tuberculosis have been received from the East and Middle West, and examined, but in no instance did the laboratory findings confirm the gross diagnosis. These lesions, confined usually to the liver, are of a conglomerate nature. Macroscopically they are characterized by a great amount of connective tissue containing numerous yellow necrotic centers. They vary in size from 10 to 40 mm. in diameter and usually protrude slightly above the liver surface and extend deep into the liver substance, occasionally completely through the liver. Histologically they are typical granulomatous processes containing multiple areas of necrosis composed of a deeply staining hyaline material and pycnotic nuclei. These necrotic areas are surrounded by giant cells, mononuclear cells, and connective tissue. In no case were acid-fast organisms found in the lesions.

This material was from turkeys which had been slaughtered, New York dressed, frozen, stored and defrosted prior to eviscerating. Despite the fact that the presence of parasites could not be demonstrated we feel that these are old lesions of histomoniasis or possibly trichomoniasis. The high incidence of these lesions in some flocks is of interest, reports of from 40 to 60 percent in a lot having been received. As yet we have not had an opportunity to study turkeys from the West coast that have been condemned for tuberculosis. The problem, however, is being studied further and a later report will be made. Slides showing this condition as well as the positive tuberculosis cases just discussed will now be shown.

